

# The Greening of Public Housing Projects

*HUD renews push to encourage public housing agencies to invest in energy efficiency programs.*

BY DEE NAQUIN SHAFER

**O**n average, local housing agencies (LHAs) spend about one quarter of their operating budgets on utilities. That's just one reason the Department of Housing and Urban Development (HUD) is looking at ways to increase energy efficiency in public housing.

Energy efficiency is a broad topic, ranging from energy and water efficient equipment such as geothermal heat pumps (*see box on page 23*) to bulk purchasing, energy-related financing, or photovoltaics. Now, thanks to a governmental interagency agreement and partnerships with Rebuild America (RA, [www.rebuildamerica.org](http://www.rebuildamerica.org)), LHAs have a growing number of models that demonstrate successful ways to save energy.

The movement picked up steam in the 1990s. A 1995 report from HUD's Office of the Inspector General cited excess utility costs in public housing—costs that could be reduced through better education and policies. Two years later, Congress asked HUD to develop strategies to reduce utility costs,

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# Partnerships with Rebuild America

By Matt Pesce

As a partner of Rebuild America (RA), a local housing agency (LHA) receives nonmonetary assistance for energy-efficiency and water-conservation projects. RA works with the LHA from concept to completion—helping to identify community partners, local resources, and financial resources on the front end and providing access to a network of experts, case studies, and peer exchanges in the middle and back end.

An RA partnership begins by determining what actions it would like to accomplish and considering necessary resources and potential partners. Energy projects can be used to reposition properties to add “curb appeal,” reduce operating and maintenance costs, or to provide cash flow to fund LHA initiatives such as increased security or resident education..

RA provides its partners decision support information to allow them to best use energy efficiency to achieve their objectives. Information is available through peer-to-peer information exchange, regional and national forums, and limited technical assistance. Support may include assisting the agency to consider energy-related technologies, consider financing options, or to review building plans, or to take advantage of bulk procurement opportunities.— which reduce supply and maintenance costs.

**Increasing cash flow:** Through operating fund regulations, LHAs can use cash flow from energy savings for eligible operating expenses. Savings fall into two classifications: consumption reduction and rate reduction. Consumption reduction is reduced electricity use (kWatt-hours) or water use (gallons per day). Rate reduction is a cutback in the price associated with an amount of consumption (for example, electricity might cost 10 cents per kWatt-hour).

While funding for necessary retrofits should first be sought from available operating and capital funds (24 CFR 965.305), LHAs can also use non-HUD funding sources by tapping into HUD’s energy incentives. Rebuild can work with an LHA to understand how to tap these HUD cash flow incentives.

**Consumption reduction:** A new revision to 24 CFR 990.110 (b) (2) allows 75 percent of consumption savings in a given year to be captured by the LHA through year-end adjustments. This results in 2.25 times a single year’s savings going back to the housing



agency to be used in operating activities.

In addition, under 24 CFR 990.107 (f), an LHA may qualify for one of two incentives that may be used to finance energy conservation retrofits. HUD must approve the use of these energy incentives.

Regulations at 24 CFR 990.107 (f) (1) allow housing authorities to use energy performance contracts as an outside source of funds. With this incentive, the LHA retains 100 percent of savings from

decreased consumption (24 CFR 110 (b) (ii)) until the term of the financing agreement is complete. The housing agency must use at least 50 percent of the cost savings to amortize the financing. As another option, a housing agency may be eligible for an additional subsidy incentive (24 CFR 990.107 (f) (2)), which is used to cover amortization costs of retrofit measures. In this option, in addition to having completed its retrofits, the housing agency keeps 2.25 times a single year’s utility savings.

**Rate reduction:** LHAs can also apply for an incentive to reduce their utility rate. Regulations at 24 CFR 990.107 (b) (2) allow housing authorities making significant rate reductions to keep 50 percent of the cost savings in the first 12 months attributable to these actions. The LHA also is eligible to retain 50 percent savings for each year that its actions continue to be cost-effective.

**Plans and utility management:** Regulations require LHAs to submit five-year plans and annual action plans (24 CFR 903.3). These plans describe activities and funding sources consistent with the LHA’s mission and objectives. A utility management program consistent with both Capital Fund and Operating Fund programs can be a critical funding source (24 CFR 903.7 (b)) used to identify and implement plan objectives.

RA can work with an LHA to understand how utility management, five-year energy audits, rate reduction strategies, and energy-related maintenance activities are key parts of management planning. These activities key into required physical needs assessments and Capital Fund plans (both five-year and annual).

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which the department addressed in its 1999 report to Congress, *Strategies for Reducing Energy Expenditures and Consumption in Public Housing*.

These reports led HUD in 1999 to an Interagency Agreement with the Department of Energy (DOE) to leverage housing support provided in the RA program to promote conservation and reduce utility costs in public housing through forums, research, demonstration, and evaluation. Formed in 1994, RA is a national network of public-private partnerships engaged in improving energy efficiency in LHAs and their communities.

The HUD-DOE agreement's primary objective was to establish 20 to 28 new RA partnerships with LHAs that demonstrate how energy efficiency and water conservation can be successfully implemented. Discussions to renew the interagency agreement, which expired in December 2002, were underway at press time.

### Developing best practices

"The [HUD-DOE] interagency agreement targeted items they wanted to try to engage with public housing authorities in particular," says Matt Pesce, consultant working with both DOE and HUD on its interagency efforts. "Our goals are to produce best practices and case studies—'lessons learned' and decision support information that could be applied or shared with the rest of the housing stock."

Energy efficiency became more of a watchword when President George W. Bush issued his energy policy for the country in May 2001. HUD developed an interdepartmental task force to produce an energy strategy that would meet the new energy policy.

In September 2002, HUD, DOE, and the Environmental Protection Agency signed a memorandum of understanding (MOU) to promote



Cherrie Turner Towers, in Canton, Ohio, was revamped with help from a partnership with Rebuild America.

the more widespread use of Energy Star products in HUD's inventory of public, assisted, and insured housing. The Consortium for Energy Efficiency is another group that promotes energy-efficient appliances. The Chicago Housing Authority has been working with this group.

Pesce says another MOU in development between HUD and DOE would cover more technical topics. "We anticipate an extension of the current interagency agreement to consider these new initiatives."

DOE, the New York State Energy Research and Development Authority, and HUD are funding a multifamily housing conference for energy that will be held in June. NAHRO, an RA partner, is on the planning committee for this conference.

### A showcase authority

The Stark Metropolitan Housing Authority (SMHA) in Canton, Ohio, revamped a senior housing high-rise with help from a partnership with RA. The work included a range of energy improvements: new roofing, efficient windows, compact fluorescent lighting, low-flow toilets, additional insulation, and geothermal heating.

The Cherrie Turner Towers, which had only an 80 percent occu-

pancy rate, was both inefficient and inadequate, says SMHA Deputy Director Mike Williams. The building had no centralized air conditioning. Some seniors had window units, which were not always properly installed, while others went without air conditioning.

"Part of our capital fund was slated for renovation of that building," Williams says. Prior to beginning work in

1999, SMHA conducted an energy audit

using DOE special project funds. The audit pinpointed the needs on which SMHA needed to focus. The authority started by getting authority from HUD to reduce the number of units from 150 to 134, creating more one-bedroom units instead of efficiencies.

SMHA put in ground source heat pumps—which transfer heat to the earth rather than outdoor air. This alternative energy source captures the earth's heat power. The authority was able to install central air conditioning, giving every unit a thermostat. The geothermal unit



### AT-A-GLANCE

- ◆ Existing partnerships between LHAs and Rebuild America demonstrate innovative ideas for energy reduction.
- ◆ Lack of time, understanding, and access are among the key barriers preventing the multifamily housing market from using more energy-efficient techniques.
- ◆ Housing authorities need an energy "champion" to ensure energy efficiency projects are initiated. Reducing utility costs and improving marketability are reasons enough.

also allowed installation of a centralized hot water system. Previously, each unit had an individual hot water tank. SMHA also installed larger windows for better lighting. The community space was enhanced with a gazebo and a garden.

Another SMHA energy-saving project involved converting condo-style units from electric to gas heat. The authority partnered with the gas company and a local community development group for the project at a cost of about \$250,000. It involved only \$90,000 of HUD capital dollars, and SMHA was able to pay back the loan in 12 months through the savings generated. The authority used an energy performance contract (*see box on page 23*).

SMHA, which subsidized utilities for the families, saw a reduction in costs. "It went from 60 percent down to 10 percent [for utilities]—more in balance with the rest of our sites. If it helps the resident save money and doesn't come back to us, it's good. That's more money they have to provide for their family," he says.

For a proposed senior center, the authority is investigating use of other green technologies, such as solar energy and microturbines. SMHA wants to turn the property into a showcase of one-stop senior services that benefits the entire community. "We are developing adjacent property as a senior center, rather than only for public housing," he says, noting the authority is working on partnerships with the YMCA, a hospital, and a credit union.

The authority has also organized a fuel-purchasing group with seven other housing agencies, called Public Housing Authority Aggregation Consortium of Ohio (PHAACO). The group purchases natural gas at a below-market rate. The average price has been 17.5 percent under market, he says. The authorities can apply to keep up to

75 percent of their savings through HUD's rate-reduction incentive. Williams notes that purchasing groups can be especially useful for small agencies, which may have difficulty leveraging funds. "But I believe we can serve as a model for agencies of any size."

Williams points to the excellence of SMHA's energy team. "We couldn't do it if it wasn't for all their work and effort," he says, citing Dr. Emmanuel Anuike with the Ohio Energy Office and Carla Clemons of Rebuild America. Involved SMHA staff are Energy Supervisor Steve Ewing, Energy Assistant Saline Cater, and Executive Director Amanda Fletcher.

The authority has received full support from the mayor's office to the point that the housing authority is now looked at as a community development partner. "We've been asked to interact with the Chamber of Commerce and other downtown improvement agencies," he says. "Through these successes, we have developed momentum. We can be part of what's good about a community."

### Reducing life-cycle costs

Energy conservation is key in a housing complex being completed in Spokane, Wash., for low-income residents. The first phase of the Riverwalk Point project is a five-building, 52-unit housing complex. Two of the five buildings were to be completed in January, with the remaining buildings scheduled for delivery in March. The units are for households of one to six occupants, with incomes ranging from \$9,780 to \$27,050 a year.

The project was developed through a partnership between RA, Spokane Neighborhood Action Programs (SNAP), and its



Energy conservation was key in the Riverwalk Point project in Spokane, Wash.

Sustainable Housing Innovation Partnership (SHIP). RA's 2002 Energy Champion Award for Public and Affordable Housing went to SHIP, a group that includes government officials, banks, architects, academics and others.

"We've built in 42 sustainability elements to Riverwalk," says partnership leader Julie Dhatt-Honekamp. The Riverwalk project includes elements such as day-lighting, which orients the building along an east-west axis for passive solar gain, without increasing the cooling load of HVAC.

Other energy-efficient techniques at Riverwalk: high-efficiency gas-fired heaters in four buildings and a geothermal heat pump in a fifth building; structural insulated panels; compact fluorescent and T8 fluorescent lighting; Energy Star appliances; and energy conservation education for every new tenant. The project includes attention to environmental details such as minimizing the amount of traditional blacktop paving, which allows rainwater a cleaner path back to the aquifer.

Dhatt-Honekamp says that for energy conservation, a dialogue about the difference between up-front costs and life-cycle costs is important. A SHIP goal has been to keep up-front costs at no more than 10 percent above the costs of a traditional project, since financial institutions focus on that initial cost.

The energy-efficient technology reduces the life-cycle costs, which represents a philosophical shift in thinking, she says. "In order to be competitive, we have to commit to a 50-year ownership period. We choose our systems very cautiously."

### Serving the underserved

Lack of understanding, time, and

access are some of the key barriers that prevent the multifamily housing market from better utilizing energy-efficient techniques, says Cyane Dandridge, executive director of Strategic Energy Innovations (SEI) in San Rafael, Calif. ([www.sei-inc.org](http://www.sei-inc.org)). Dandridge helped launch the California Multifamily Housing Consortium (CMHC) this year to improve delivery of energy efficiency services to the multifamily sector, in both existing and new construction dwellings.

"SEI focuses on the underserved market—schools, small businesses, affordable housing—and on innovative ways to serve them," she says. One example involved a senior housing facility. SEI and ICF Consulting in San Francisco are working on an agreement with the

owner that if residents conduct energy patrols of their site, the owner will give 50 percent of the savings back to the facility to use as needed.

Dandridge recommends taking a long-term view on costs. Frequently, developers will label energy-efficient technologies as too expensive, without considering the long-term benefit. Potential solutions are available, she notes. Some states like California, for example, will give tax credits to developers for using "green" building technologies that save energy.

"The tenant-landlord issue is a huge barrier," she says. "They don't see the benefit [of energy efficiency] unless they're master-metered." Low-income tenants in particular suffer, because higher utility fees

mean LHAs can provide less housing and services.

An important policy change for affordable housing would include restructuring of the utility allowance. SEI and the Heschong Mahone Group in Fair Oaks, Calif., are working on a program to structure an energy-efficient utility allowance. Dandridge calls this potential change a win-win-situation. "You could increase the rent that goes to the landlord and reduce the cost to the housing authority paying the utility." The tenant would benefit through an improved living situation.

High utility bills are a loss for the environment and for the local economy, Dandridge says. "Seventy percent of a paid bill will go to a utility company."

SEI is working with HUD on this

## Energy Terms You Should Know

### ◆ Energy Performance Contracting

A financing technique that uses cost savings from reduced energy consumption to repay the cost of installing energy conservation measures. Normally offered by energy service companies, this financing technique allows the capture of benefits from energy savings without upfront capital expenses on the part of the building owners. Costs of the energy improvements are borne by the performance contractor and paid back out of the energy savings.

### ◆ Cool Roofs

Most traditional dark roof materials are "hot," absorbing 70 percent or more of the solar energy striking them. Cool roofs absorb less than 35 percent of solar energy and stay 50 to 60 degrees cooler during peak summer conditions than traditional dark roofs. It results in an average of a 20 percent savings on cooling costs.

### ◆ Microturbines

These can be used to generate electricity locally. They are small combustion turbines, approximately the size of a refrigerator, with outputs of 25 kW to 500 kW, and can be located on sites with space limitations for power production. Microturbines are composed of a compressor, combustor, turbine, alternator, recuperator, and generator. Waste heat recovery can be used in combined heat and power

systems to achieve energy efficiency levels greater than 80 percent. In addition to power generation, microturbines offer an efficient and clean solution to direct mechanical drive markets such as compression and air conditioning.

### ◆ Geothermal Heat Pumps

These systems do not create heat; they move it from one area to another. Geothermal heat pumps rely on the relative warmth of the earth for their heating and cooling production. Through a system of underground (or underwater) pipes, they transfer heat from the warmer earth or water source to the building in the winter, and take the heat from the building in the summer and discharge it into the cooler ground.

### ◆ Heat Pump Water Heater

Functions similarly to the popular house heat pump air conditioning systems in that it extracts heat from surrounding air. The heat pump water heater, however, transfers that extracted heat to water stored in a tank. By capturing "free" heat from surrounding air, the heat pump water heater can transfer almost twice as much heat energy to the water than the electric energy it consumes. This ability to use heat from the air is what makes the heat pump water heater more efficient than standard electric water heaters.

proposed change because LHAs lack authority to restructure the utility allowance on their own. “When we talk to housing authorities, their main concern is if HUD could come out with a statement [about utility restructuring].”

She also speaks of raising the information level in LHAs about energy efficiency. A chart for housing managers could list the 10 most important energy-saving techniques in maintenance and operation.

Dandridge refers to a critical aspect of running energy-efficiency programs—having an informed person on staff. A HUD-DOE report noted that without an energy “champion” within a housing authority, energy projects are not initiated. Conversely, if that person leaves the authority, current and future energy projects stop.

However, while having an energy champion is important, institutionalizing the knowledge is more valuable, Dandridge says. For example, the “10 energy saving techniques” should be posted in the facilities office. “They can be part of the daily schedule that everyone sees.”

### **Finding energy champions**

Mark Ternes, research and development staff member with the Oak Ridge National Laboratory in Oak Ridge, Tenn., says one way to keep energy policy at the forefront is to convince someone at the LHA that addressing energy efficiency offers a benefit.

“What motivates housing authorities? Saving energy isn’t the motivation. But improving marketability should be,” Ternes says.

He points to potential benefits.

One is reducing utility costs, which typically represent 25 percent of LHA operating expenses. By upgrading indoor air quality, a manager can make the units more comfortable and reduce complaints. If the units are more marketable, they will produce more income, which will allow the LHA to further improve the property.

Energy solutions are the answer, he says. “The housing authorities where people have been [energy] leaders, people have realized that—energy efficiency and their goals go hand in hand.”

As time passes and more case studies are available, it will be more difficult for people to say energy efficiency does not work, Ternes says. “We have to do more to show that it’s not unique. It’s not difficult. And it is applicable.” ■